THE ORGANIZATION AND ADMINISTRATION OF THE AUDIOMETRIC TESTING PROGRAM

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F O R E W O R D

One of the most gratifying trends discernible in Pennsylvania schools today is the ever-increasing attention to the physical well-being of children. Recent studies indicate that a large proportion of school children are handicapped in their school work and retarded in their progress through school because of subnormal hearing.

The impairment of hearing is a health problem and health problems are school problems. School administrators especially should consider this carefully, for hearing and health are closely related. The conservation of hearing by early detection of hearing loss and proper follow-up work is now the direct legally imposed responsibility of every school administrator.

Act 547, passed by the 1937 session of the General Assembly authorizes the Department of Public Instruction to test the hearing of all school children annually. The act further specifies that "The Department of Public Instruction shall prescribe to the boards of school directors and medical inspectors of schools suitable rules of instructions as to the tests and examinations to be made as provided in this section."

In accordance with this suthorization the bulletin on "The Organization and Administration of the Audiometric Testing Program" was prepared by Frank P. Maguire, Chief, Division of Health and Physical Education, and Margaret Durkin, Adviser, Audiometric Testing, under the direction of Paul L. Cressman, Director, Bureau of Instruction. Acknowledgment is made to Mrs. Eleanor Ronnei, Supervisor of Audiometric Testing, New York State, Miss Estelle Samuelson, Executive Secretary of the League for the Hard of Hearing, New York City, and Miss Roberta Laird, Supervisor, Audiometric Testing, Philadelphia, for their valuable suggestions from the broad field of their experience.

LESTER K. ADE

Superintendent of Public Instruction

October, 1938

The Organization and Administration

of the

Audiometric Testing Program

THE AUDIOMETRIC TESTING PROGRAM FOR 1938-1939

The State Advisory Committee on Audiometric Testing appointed by Dr. Lester K. Ade, October, 1937, has approved the program formulated by the Division of Health and Physcial Education for testing the hearing of school children for the school year 1938-1939.

The chief objectives of the audiometric testing program

1. To detect incipient cases of hearing loss in children in order that subsequent serious impairment of hearing may be prevented.

2. To discover and recommend for treatment cases of subnormal hearing acuity due to pathological condition.

3. To recommend that necessary educational adjustments be made in all such cases to fit the needs of the individual child. Such adjustments may include one or a combination of as many of the following as the child may require: advantageous seating, lip reading, voice and speech training, special class education, vocational counseling.

Classification of pupils to be given the audiometric hearing tests

1. All pupils in the 3rd and 7th grades.

2. All pupils in any grade who recorded a hearing loss of 9 decibels or more in the final test of the second semester last year.

3. All pupils from grades 1 to 12 who are habitual absentees because of colds.

4. All pupils from grades 1 to 12 who have had a communicable disease within the last year.

5. All pupils from grades 1 to 12 who have running ears or other inner ear trouble.

6. All pupils from grades 1 to 12 who were not promoted last year.

7. All other pupils from grades 1 to 12 whose attitude of apparent indifference toward the work of the classroom is suspected as being caused by defective hearing.

The testing schedule

During the first semester of the school year the testing will be conducted in the schools under the jurisdiction of district superintendents. After the completion of the third test in these districts, the audiometers will be turned over to the county superintendents for use in their districts during the second semester.

The time schedule has been based on the number of schools in each district, and the enrolment as given in the Superintendents' reports for 1937-1938. Sufficient time has been allotted for the first and second tests to be given in each district before moving the audiometer to the next district. A week's interval between the two tests is not required; each district will allow as long an interval as the time allotment permits. A four-week's interval is provided between the second and the third tests.

There will be a comparativoly small number taking the third test, usually not more than ten per cent of those who took the first test. If the pupils who are to be given the third test are assembled in a convenient center, much time can be saved. Through such cooperation, every district will have an opportunity to do a complete job, and the follow-up program can be effectively carried out.

General suggestions

The person in charge of the testing will send to the principals of schools a week in advance, the date on which the testing will begin, the classes of pupils to be tested, class record sheets, and a list of requirements for the testing.

Before the date set for the testing program, a teachers' meeting should be held in each school in order to insure the sucessful working out of the program. The testing should be explained, class record sheets distributed, a final checking up of pupils to be tested as listed under classifications 3-7,

and plans for keeping the building quiet should be discussed. In many schools it has been found helpful to appoint older boys and girls to act as monitors. They bring groups to the test room, and keep the corridors quiet.

Requirements for audiometric testing

1. A QUIET classroom.

It is essential that the tests be given in a quiet classroom. Too much emphasis cannot be placed on this feature. For this reason, a room near the gymnasium, shops, music room, and the like cannot be used. A room free from any and all outside noises, preferably on the top floor, should be assigned for the testing. It is not desirable to seat the children at long tables. Whenever possible, a classroom furnished with individual desks should be selected.

2. Four dozen sharpened leat pencils.
3. Forty fbotters approximately 4" x 9" to deaden the sound of pencils on desks.
4. Four empty waste paper baskets on which to place the receiver trays.
5. Two silence placards to be placed in halls near the testing room.

Directions for giving the test

Before the children enter the classroom, make a copy of the recording sheet on the blackboard with the first two numbers 5-4, 4-1 written in the first colum.. Place a recording sheet, a blotter, and a sharpened pencil on each desk. Forty pupils may be tested at one time, but if, because of the size of the room, or the arrangements of the desks, the person in charge of the testing finds that she can give the test more effectively to smaller groups, she may arrange the number to suit conditions. Thirty is a convenient number to manage.

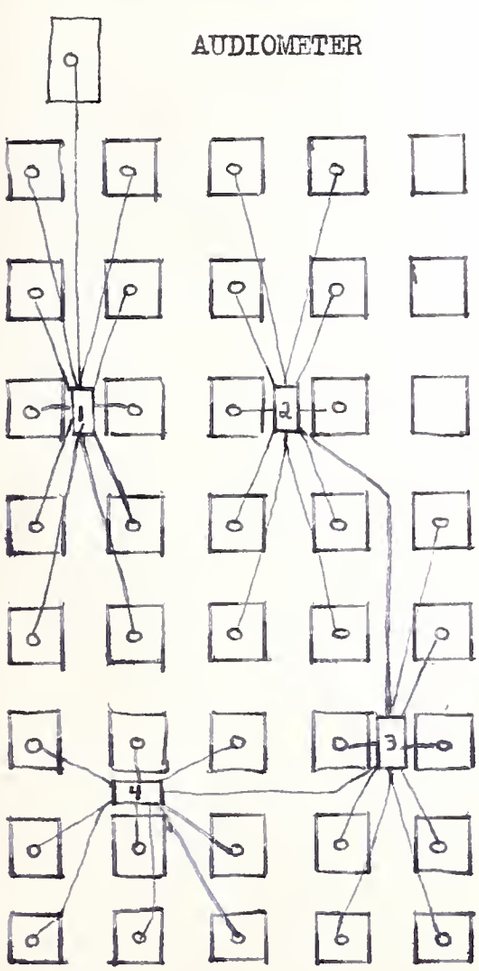
Place the audiometer on the teacher's desk. The desk must be flat top. Open the case, remove the crank from its clips, insert it into the hold next to the handle of the audiometer case, and turn it in a clockwise dinection until it

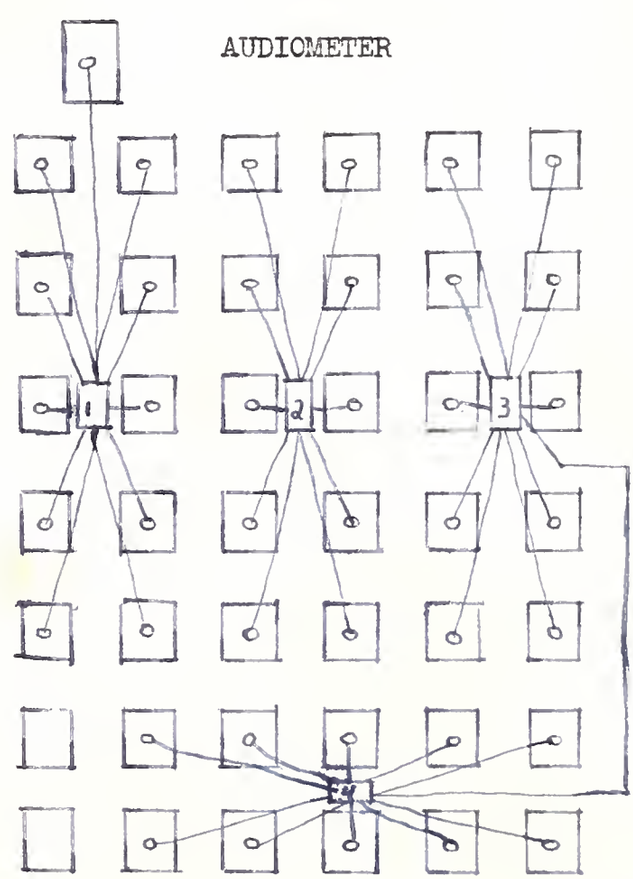
is screwed on. Continue to turn until the motor is wound up. A cord and plug attached near one end of each receiver tray, and a jack at the other and serve as the connection equipment. The connection is made with the audiometer by inserting the plug of one receiver tray into the jack beside the right hand hole in the audiometer case. The second tray is connected with the first by inserting the plug into the jack in the first tray and so on to the remaining trays.

The placing of the receiver trays should be plotted with a view to keep alternate aisles open for pupil traffic. Diagrams I and II show possible arrangements of receiver trays and connections when groups of more than thirty are tested. Diagram II, figures 1, 2, 3, show an ideal arrangement for testing groups of thirty children.

When the trays are placed, and the connections made, the receivers should be removed from the trays, the cords straightened and the receiver tops first loosened and then tightened. The receivers are then placed on the desks face downward.

Diagrams showing possible arrangement of audiometer and receiver trays in schoolroom.





NAME Mary Small

AGE 10 years

GRADE 5

DATE February 7, 1938

Earphone number 223

INSTRUCTIONS

YOU WILL HEAR NUMBERS SPOKEN BY A PERSON WHO IS MOVING AWAY FROM YOU. THE VOICE WILL GET WEAKER AND WEAKER. LISTEN CAREFULLY AND WRITE AS MANY NUMBERS AS YOU CAN.

Percentage Hearing Loss	RIGHT EAR 1	2	3	4	LEFT EAR 1	2	3	4	Percentage Hearing Loss
30	54	56	85	64	48	55	48	38	30
27	41	68	83	4~~8~~	23	54	63	43	27
24	84	63	42	42	66	88	83	52	24
21	51	14	1~~3~~	82	41	42	32	51	21
18	18	34	61	21	1	23	85	22	18
15		12	35	15	6	85	6	56	15
12		31	3~~4~~	5	21	~~3~~6	1~~3~~	6	12
9	11	~~3~~3	44	4			4	5	9
6	4		5	~~5~~0					6
3									3
0									0
-3									- 3

HEARING LOSS 9 HEARING LOSS 12

Preliminary test of receivers by special test record

Adjust the speed of the turn table by placing the dial at 80, wind up the motor, set the special test record in place, and insert a new needle. The person who is conducting the test should listen to every receiver with the same ear to make certain that the buzzing sound is heard with equal intensity or loudness in each receiver. This check-up should be made once a day and whenever the audiometer is moved. Remove the special test record.

Conducting the test

Set the No. 3 record in place, rewind the machine, and insert a new needle. In order to obtain the best results from the test, the children should feel at ease. A child who is emotionally upset should not be required to take the test until the fear disappears. As the word "test" is usually associated in their minds with grades and report cards, it would be well, before beginning the test, to explain simply and briefly, the nature and purpose of the test.

The person in charge of the test may use whatever approch she finds effective for each group. For example, she may say to a third grade group. "WHEN WE PUT ON OUR EAR PHONES AND THE TEST BEGINS, YOU WILL HEAR A WOMSN'S VOICE SAYING, 'YOU ARE NOW GOING TO HAVE YOUR HEARING TESTED. LISTEN CAREFULLY, AND WRITE THE NUMBERS YOU WILL HEAR IN THE FIRST COLUMN.' THE FIRST NUMBER SHE WILL SAY IS '5-4' AND YOU WILL WRITE IT IN THE FIRST COLUMN, JUST AS YOU SEE IT WRITTEN ON THE BLACKBOARD. SUPPOSE YOU WRITE IT NOW ON YOUR PAPERS. THE NEXT NUMBER WILL BE '4-1,' AND YOU MAY WRITE THAT IN THE SPACE BELOW AS YOU SEE IT ON THE BOARD. AS YOU LISTEN, THE WOMANS VOICE WILL BECOME SOFTER AND SOFTER AS THOUGH SHE WERE MOVING FARTHER AND FARTHER AWAY. IF YOU HEAR ONLY ONE OF THE NUMBERS, FOR EXAMPLE, IF SHE SAYS '2-3,'AND YOU HEAR ONLY 3, WRITE IT. IF YOU CANNOT

HEAR A NUMBER CLEARLY ENOUGH TO WRITE IT, LEAVE A SPACE AND WRITE THE NUMBER YOU HEAR IN THE SPACE BELOW. THE WOMAN'S VOICE WILL SAY THE NUMBERS FOR COLUMNS ONE AND TWO, AND A MAN'S VOICE, THE NUMBERS FOR COLUMNS THREE AND FOUR.

"WE ARE GOING TO TEST THE RIGHT EAR FIRST. TAKE THE EAR PHONE IN YOUR RIGHT HAND, WITH THE CORD AT THE BOTTOM OF THE RECEIVER. SPREAD THE WIRE WITH THE LEFT HAND AND BRING IT DOWN OVER THE TOP OF YOUR HEAD. PLACE THE RECEIVER OVER THE RIGHT EAR SO THAT THE HOLES IN THE RECEIVER ARE OVER THE OPENING OF THE EAR. THE HEAD BAND ACROSS THE TOP OF THE HEAD WILL HOLD THE EAR PHONE IN PLACE."

The person in charge should carefully inspect the position of the phones to see that they are correctly placed, that the girls have pushed their hair behind their ears, and that the left ear is not covered by the leather piece.

"WE ARE NOW READY FOR THE TEST. DO NOT WRITE UNTIL YOU HEAR THE THIRD NUMBER BECAUSE YOU HAVE ON YOUR PAPERS THE FIRST TWO NUMBERS." Start the record, and when it picks up momentum place the needle on the edge, guide it to the first groove, then close the case.

When the test for the right ear is completed, have the ear phones placed carefully face downward on the desks. Rewind the machine, turn the record and insert a new needle.

"WE ARE NOW GOING TO TEST THE LEFT EAR. WRITE THE NUMBERS THAT YOU HEAR IN COLUMN 5." Point out Column 5 as shown on the black board. "TAKE UP THE EAR PHONE WITH YOUR LEFT HAND, WITH THE CORD AT THE BOTTOM OF THE RECEIVER, AND PLACE IT OVER THE LEFT EAR IN THE SAME WAY AS YOU DID ON THE RIGHT EAR."

The person in charge will again carefully inspect the placing of the phones, then complete the test for the left ear.

Clip the recording sheets together and label them with the name of the teacher, grade, and school. As soon as time permits, compare the class list with those on the recording sheets, note the absentees in order that they may

be given the test when they return to school.

Directions for testing children who cannot write

The hearing test must be given individually to the children ingrades one and two who come under the groups named on the testing program. The child repeats the number to the teacher or the nurse, who, also equipped with a receiver, compares the repeated numbers with those on the master card which the child cannot see. The person giving the test writes on the record sheet the symbol ✓ when the child repeats the number correctly, the symbol _ when the number is incorrectly repeated, and 0 when no number is repeated. If the child repeats all the numbers correctly in the first column down to and including the 6 decibel level, the test need not be carried through the other three columns. If not, the test is carried on and scored according to instructions on pages 8-9. Both ears are tested in this way.

Two persons may conduct this individual testing in the same room, at the same time, if they are seated at a sufficient distance apart, so that the repetition of the numbers will not be audible beyond the child who is being tested. This distance can be obtained by connecting up two receiver trays with the audiometer. The individual testing will move quickly and pleasantly if given as though it were a game.

Scoring the hearing tests

The pupil's score is based on the correctly recorded unbroken column of numbers which shows his lowest hearing loss, even if he makes the score in only one of the four columns; or the lowest correct number in a column may be regarded as the score, although proceded by one or more spaces, or an incorrect number, if the numbers at the same level as these blanks are recorded correctly in any one of the other three columns.

The sample sheet is a facsimile of an actual test record. It shows two blanks at the levels of 15 and 12 in the first column of the right ear record sheet. Columns 2, 3, 4, however, record the numbers correctly at the 15 level, and column 2 records the number correctly at the 12 level. This indicates that, notwithstanding the blanks in the first column, the child hears at these levels. His lowest correct numbers are 11 and 44 written at the 9 decibel level, hence his hearing loss is 9 for the right ear.

In the left ear score, although the first column is broken at the 18 and 15 levels, the numbers are recorded correctly in columns 6, 7, and 8, at the 18 level, and in 6 and 8 at the 15 level. The pupil obviously hears at these levels, and his last correct number is 21 at the 12 level, hence his hearing loss is 12 for the left ear.

The first test

Scores which range from 6 to -3 are regarded as satisfactory. A pupil scoring a loss of 9 or higher for either or both ears should be retested after at least a day's interval.

The second test

If a pupil records a hearing loss of 9 or more in the second test, he should be kept under observation by the teacher and should be given a third test at the end of four weeks. In this interval temporary hearing losses caused by colds or other conditions at the time of the previous test may disappear.

The third test

A pupil who records a hearing loss of 12 or more in all three tests should be given an advantageous seat. He should be reported for individual testing, and his parents should be urged to have the child's ears examined by an ear specialist. If the score sheet indicates that a pupil has a hearing loss of 30 or higher (score X), he should be reported for an individual test with the 6A audiometer on the form provided. (Aud. Form -3)

Points to be observed in the use of the audiometer and the ear phones

The audiometer should be rewound and a new needle inserted each time the record is turned.

The needle should be a full-tone steel phonograph needle. It should be removed at the close of the testing period.

A record should be used only one hundren times. Each district will indicate, in the space provided for the records the total number of times the record has been used, as Plainville 26.

Ear phones should be placed on the desks and in the trays with the perforated side down.

The ear phones should be sterilized with alcohol applied with cotton.

In sterilizing the ear phones, care should be taken that no liquid is dropped into the performations.

Reports

Form Aud. - 1, class record sheet, will contain the names of the pupils in each classroom. These class sheets will furnish the data for the final report to be sent to the school authorities. A copy should be in the hands of the principal of the school, and the teacher of the class.

Form Aud. - 2, second test, is self-explanatory.

Form Aud. - 3, will contain the names of those pupils who recorded a hearing loss of 12 or higher in the third test, and who have been recommended for (1) seat adjustment, (2) individual testing, (3) medical treatment, (4) lip reading, (5) voice and speech training, (6) special education, and (7) vocational counselling. A copy of this report should be sent to the Division of Health and Physical Education, Department of Public Instruction.

Form Aud. - 4 is a final summary of the testing program of the school, and should be kept in the principal's office and a copy sent to the Superintendent of Schools.

Form Aud. - 5 is a final summary of the testing program of the district.

This report is to be sent to the Division of Health and Physical Education, Department of Public Instruction.

Sources of information concerning audiometers

A number of cities and boroughs have purchased their own audiometric equipment, and are thereby doing a great service to the children under their charge. They are able to test the hearing of all the children periodically, and may thus discover cases of hearing loss in time to prevent serious hearing impairment. They have the opportunity to plan and carry out remedial and educational adjustments for the children who require such, and their work in lip reading, and special education is highly commendable.

For those districts which are contemplating purchasing audiometric equipment, information concerning audiometers may be obtained from the following associations which have set up standards and specifications for instruments of this type:

Council of Physical Therapy, American Medical Association
535 North Dearborn Street
Chicago, Illinois

American Standards Association
29 West 39th Street
New York City

The National Bureau of Standards
U. S. Department of Commerce
Washington, D. C.

The National Bureau of Standards will test any privately or publicly owned audiometer to determine whether or not an individual instrument meets the specifications of its make and type.

September 1, 1938

Form Aud.-1

Class Record Sheet

Teacher's name _____ District _____

Grade _____ County _____

School _____ Date _____

Test conducted by _____

	Hearing Loss*				Hearing Loss*		
Name of Pupil	Age	Rt.Ear	L.Ear	Name of Pupil	Age	Rt.Ear	L.Ear

*This is the final score of each pupil.
This form is to be sent to the school principal.

Form Aud.-2

SECOND TEST

School _____ Test conducted by _____

District _____

County _____ Date _____

		Hearing Loss				Hearing Loss	
Name of Pupil	Grade	R.Ear	L.Ear	Name of Pupil	Grade	R.Ear	L.Ear

This form is to be retained by the person conducting the test.

Form Aud.-3

Recommendation made by _____

School _____

HEARING LOSS

District _____

County _____

Date _____

Name of Pupil	Grade	1st Test Date		2nd Test Date		3rd Test Date		Recommendations*						
		R.E.	L.E.	R.E.	L.E.	R.E.	L.E.	I	II	III	IV	V	VI	VII

*Check recommendation made for each pupil.

I. Advantageous seating
II. Individual test
III. Referred to family physician or ear specialist
IV. Lip reading instruction
V. Voice and speech training
VI. Special class education
VII. Vocational Counseling

This report is to be sent to the Superintendent of Schools

Form Aud.-4

Name of School _____

District _____

Principal _____

Date _____

FINAL SUMMARY OF SCHOOL TESTING PROGRAM

	Right Ear										Left Ear									
Grade	-3 to 6	9	12	15	18	21	24	27	30	X*	-3 to 6	12	15	18	21	24	27	30	X*	TOTAL NUMBER TESTED
I																				
II																				
III																				
IV																				
V																				
VI																				
VII																				
VIII																				
IX																				
X																				
XI																				
XII																				

*Pupils who have recorded no numbers

Form Aui.-5

Superintendent _____

School District _____

County _____

REPORTS OF 4B SUDIOMETER TEST

Date _____

GRADES	I	II	III	IV	V	VI	VII	VIII	IX	X	XII
No. of Pupils tested first time											
No. of pupils tested second time											
No. of pupils tested third time											
No. of pupils who scored 9 or above in third test											
No. of pupils recommended for advantageous seating											
No. of pupils recommended for individual test											
No. of pupils referred to family physician or ear specialist											
No. of pupils recommended for lip reading instruction											
No. of pupils recommended for voice and speech training											
No. of pupils recommended for special education											

This report is to be sent to the Division of Health and Physical Education, Dept. of Public Instruction